Suisun Marsh Monitoring Program
Channel Water Salinity Report

Reporting Period: December 2014

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1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per the State Water Resources Control Board (SWRCB) Water Rights Decision 1641 (D-1641), dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity, which is referred as "specific conductance" (SC). The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below to ensure salinity standards are met to protect habitat for waterfowl in managed wetlands:

COMPLIANCE STATIONS:		
Station Identification	Station Name	General Location
C-2*	Collinsville	Western Delta
S-64	National Steel	Eastern Suisun Marsh
S-49	Beldon Landing	North-Central Suisun Marsh
S-42	Volanti	North-Western Suisun Marsh
S-21	Sunrise	North-Western Suisun Marsh

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh:

MONITORING STATIONS:		
Station Identification	Station Name	General Location
S-97	Ibis	Western Suisun Marsh
S-35	Morrow Island	South-Western Suisun Marsh

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

2. MONITORING RESULTS

2.1 Channel Water Salinity Compliance

December 2014 was the twelfth month in the deficiency period that started January 2014. A deficiency period is defined by D-1641 Table 3 footnote 6. During the month of December, all five compliance stations were in compliance with channel water salinity standards (Table 1). Compliance with standards for the month was determined for each compliance station by comparing the progressive daily mean (PDM) of high tide SC with respective standards. The standard for December was 15.5 mS/cm for stations Collinsville (C-2), National Steel (S-64), Beldon Landing (S-49), and the deficiency standard was 15.6 mS/cm for stations Sunrise Club (S-21) and Volanti (S-42).

The progressive daily mean is the monthly average of both daily high tide SC values. The mathematical equation is shown below:

$$PDM = \frac{\sum \text{daily average of high tide SC}}{\text{\# days in the month}}$$

2.2 Delta Outflow

Outflow for December 2014 ranged between 5,400 cfs and 60,200 cfs (Figure 3). For the month, outflow began at 5,800 cfs and peaked at 32,400 cfs on December 7th. Outflow then dipped to 10,200 cfs on December 11th before increasing to a high of 60,200 cfs on December 16th. Outflow then decreased steadily and ended the month at 16,500 cfs. The monthly Delta outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for December 2014 is listed below:

Month	Mean NDOI (cubic feet per second)
December	32,053

2.3 Precipitation

There were four precipitation events in December 2014. The first started in November on November 29th and ended on December 4th. The whole event produced 4.37 inches of rain with 3.52 inches occurring in December. The second event occurred on

December 6th and dropped 0.16 inch of rain. The third event took place between December 11-12 and 3.44 inches of precipitation fell. The last event produced 3.30 inches of rain and occurred between December 15-21. December's historical average precipitation in Fairfield is 4.30 inches. The monthly total precipitation recorded at the Fairfield Water Treatment Plant is below:

Month	Total Precipitation (inches)
December	10.42

2.4 Suisun Marsh Salinity Control Gates Operations

Operations and flashboard/boat lock installations at the Suisun Marsh Salinity Control Gates (SMSCG) during December 2014 are summarized below:

Date	Gate Status	Flashboards Status	Boat Lock Status
Dec. 1-3	3 Open	In	Partially Closed
Dec. 4-14	3 Operational	In	Partially Closed
Dec. 15-31	3 Open	In	Partially Closed

Due to an electrical control systems failure on November 18th, the SMSCG were not tidally operated between November 19th and December 3rd. The gates were set in the open position while repairs to the systems were being conducted. Tidal gate operations resumed on December 4th. On December 15th, work began on the replacement of the communication and control systems at the SMSCG. The gates were set in the open position during this project which took place between December 15-31.

3. DISCUSSION

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- Delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operations of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions During the Reporting Period

For December 2014, PDM salinity levels at the five compliance stations are shown in Figure 1. Salinity levels for December started in the range of 11.64 mS/cm to 17.35 mS/cm and ended the month in the range of 3.04 mS/cm to 11.10 mS/cm. Salinity at all five compliance stations decreased in response to the 10.42 inches of precipitation that fell during December.

Salinity levels at monitoring stations S-35 and S-97 are shown in Figure 2. Salinity at S-35 began the month at 18.41 mS/cm and ended the month at 11.69 mS/cm. At station S-97, salinity began the month at 17.52 mS/cm and decreased to 8.19 mS/cm.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high tide SC at the compliance and monitoring stations for December 2014 were compared with means for those months during the previous nine years (Figure 4).

December 2014 mean salinity pattern for all compliance and monitoring stations ranked the eighth highest in salinity levels for the past 10 years. Salinity values in 2014 matched that of 2005 which was an above normal water year. As expected, the salinity levels gradually increased from east to west.

Table 1: Monthly Mean High Tide Specific Conductance at Suisun Marsh Water Quality Compliance Stations
December 2014

Station Identification	Specific Conductance (mS/cm)*	Normal Standard	Normal Standard Met?	Deficiency Standard	Deficiency Standard Met?
C-2**	3.04	15.5	Yes	N/A	N/A
S-64	6.40	15.5	Yes	N/A	N/A
S-49	11.10	15.5	Yes	N/A	N/A
S-42	9.24	N/A	N/A	15.6	Yes
S-21	7.93	N/A	N/A	15.6	Yes

*milliSiemens per centimeter
**The representative data from nearby USBR station is used in lieu of data from station C-2.

Figure 1: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance for Compliance Stations December 2014

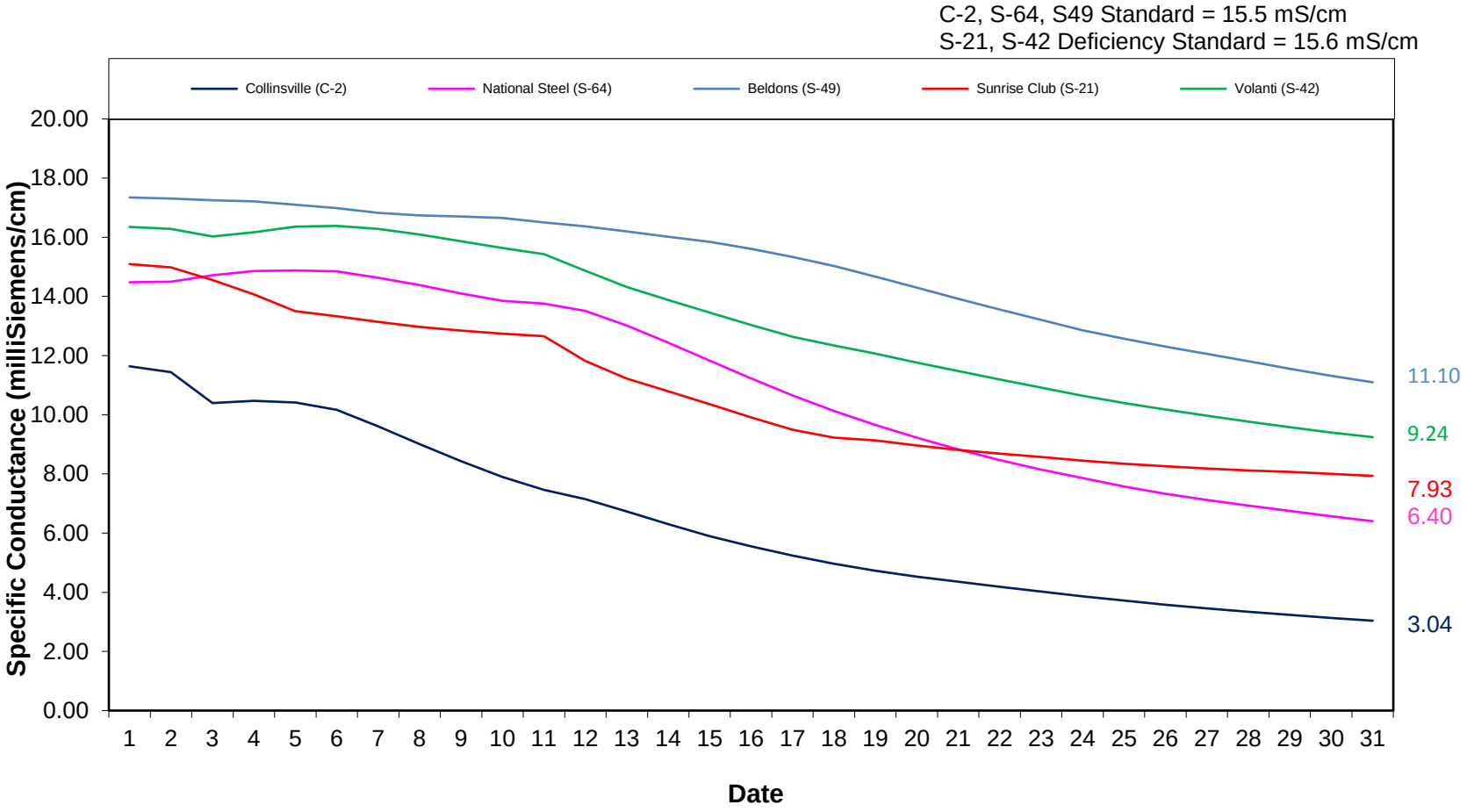


Figure 2: Suisun Marsh Progressive Daily Mean High Tide Specific Conductance for Monitoring Stations December 2014

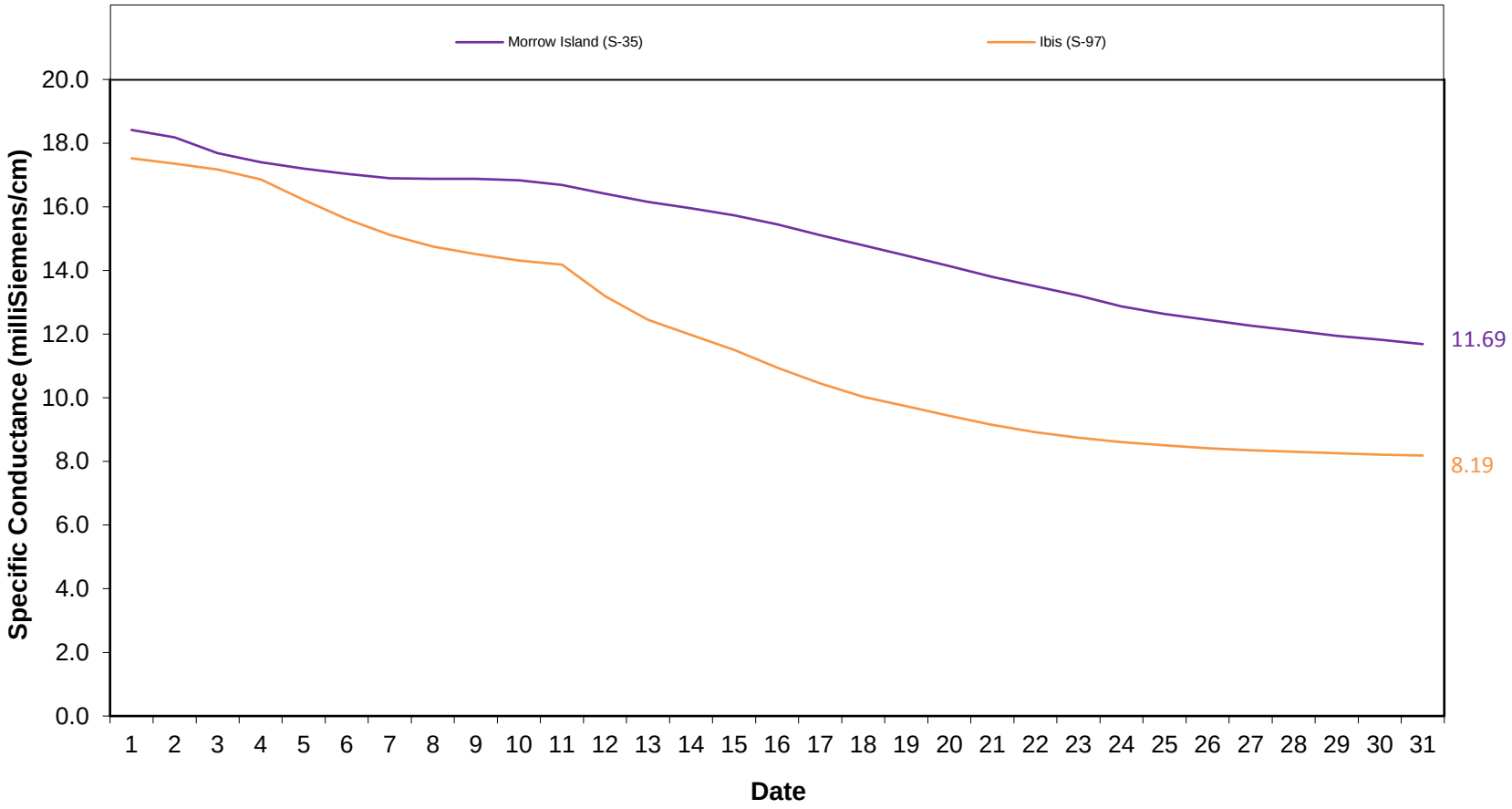


Figure 3: Daily Net Delta Outflow Index and Precipitation
December 2014

*Preliminary DWR, O&M data
**Precipitation data from Fairfield Water Treatment Plant

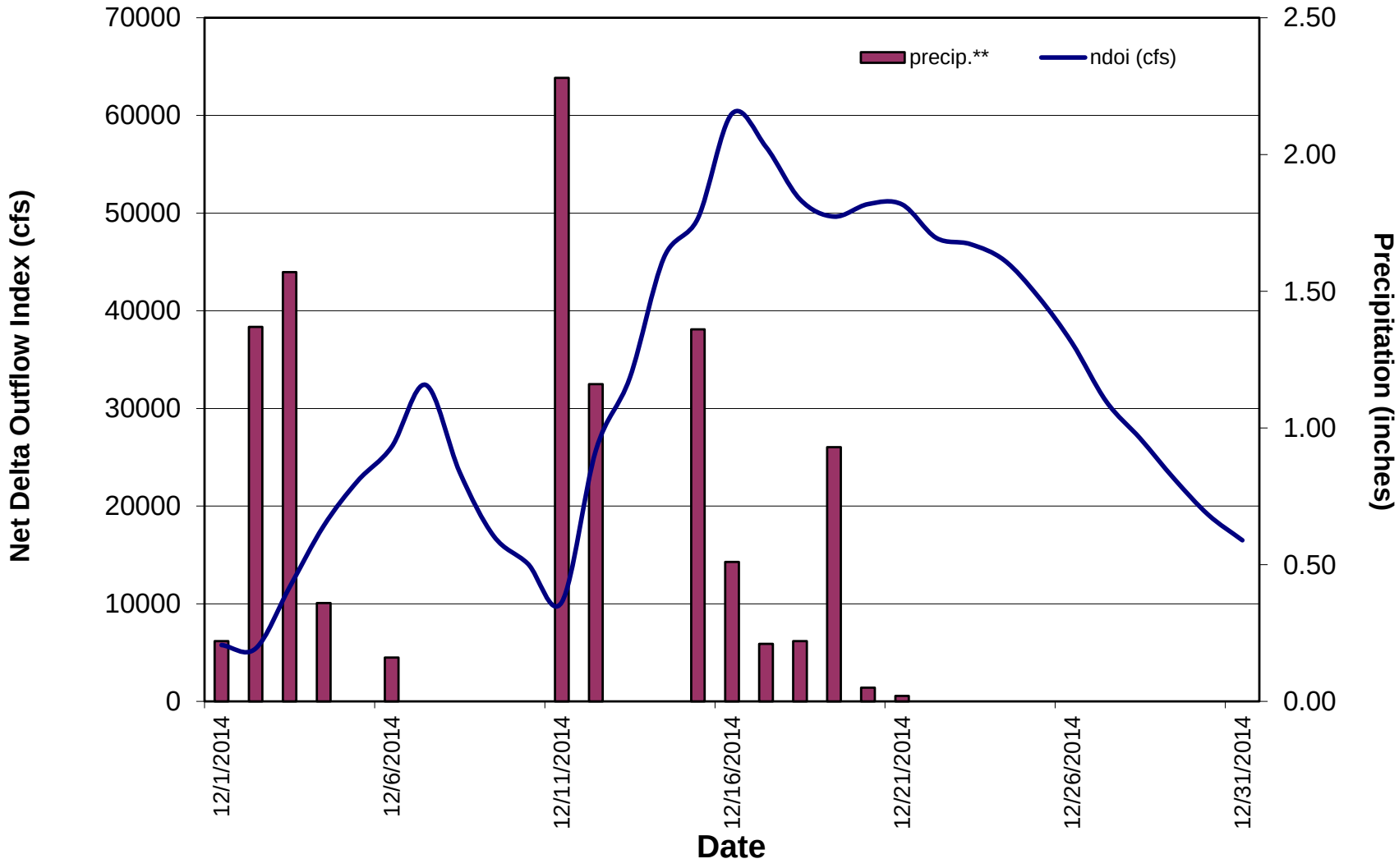
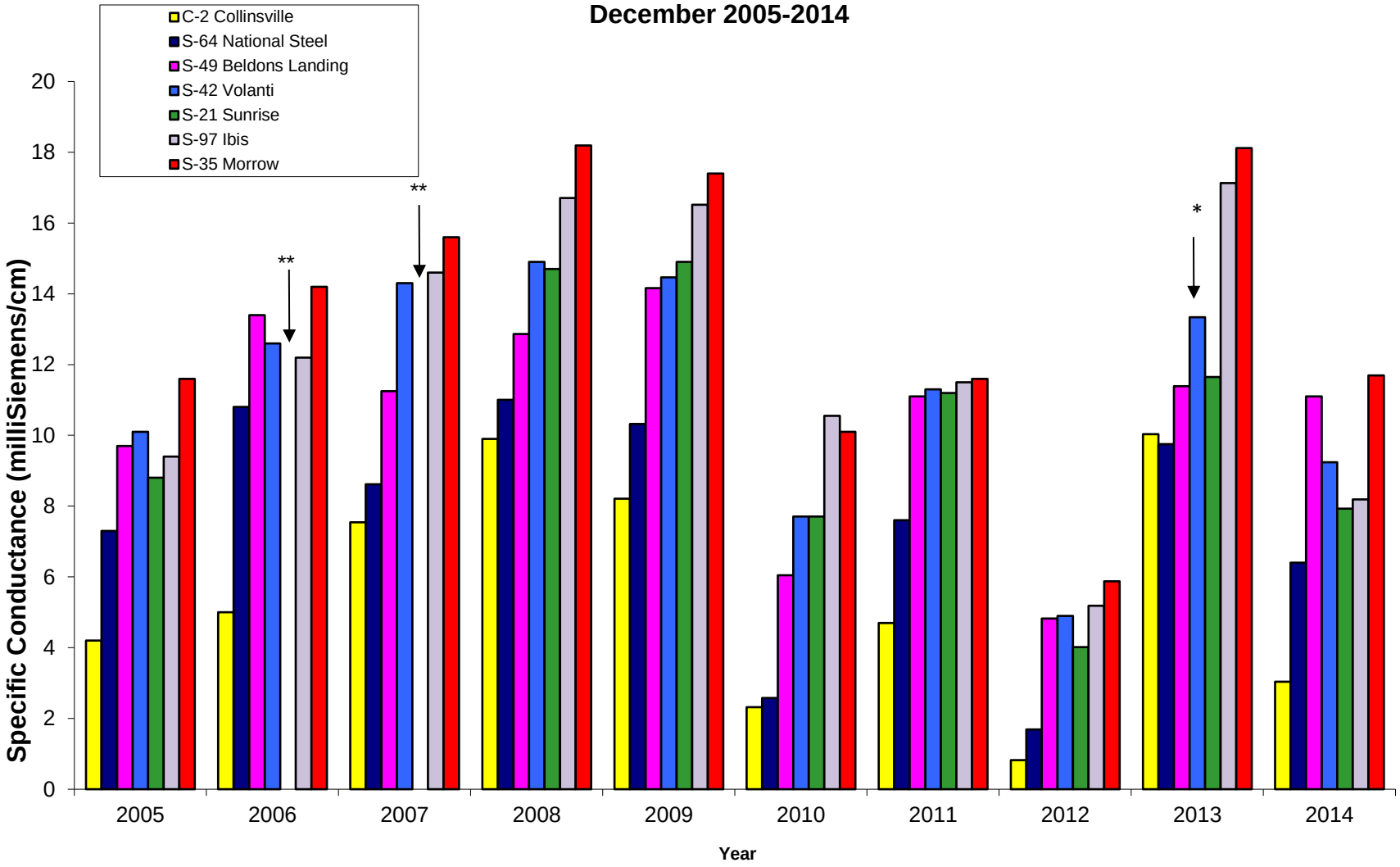


Figure 4. Monthly Mean Specific Conductance at High Tide: Comparison of Monthly Values for Selected Stations December 2005-2014



* Data reflects a partial month. Data collection was interrupted before the end of the month due to equipment failure.

** Data was not obtained due to equipment failure.

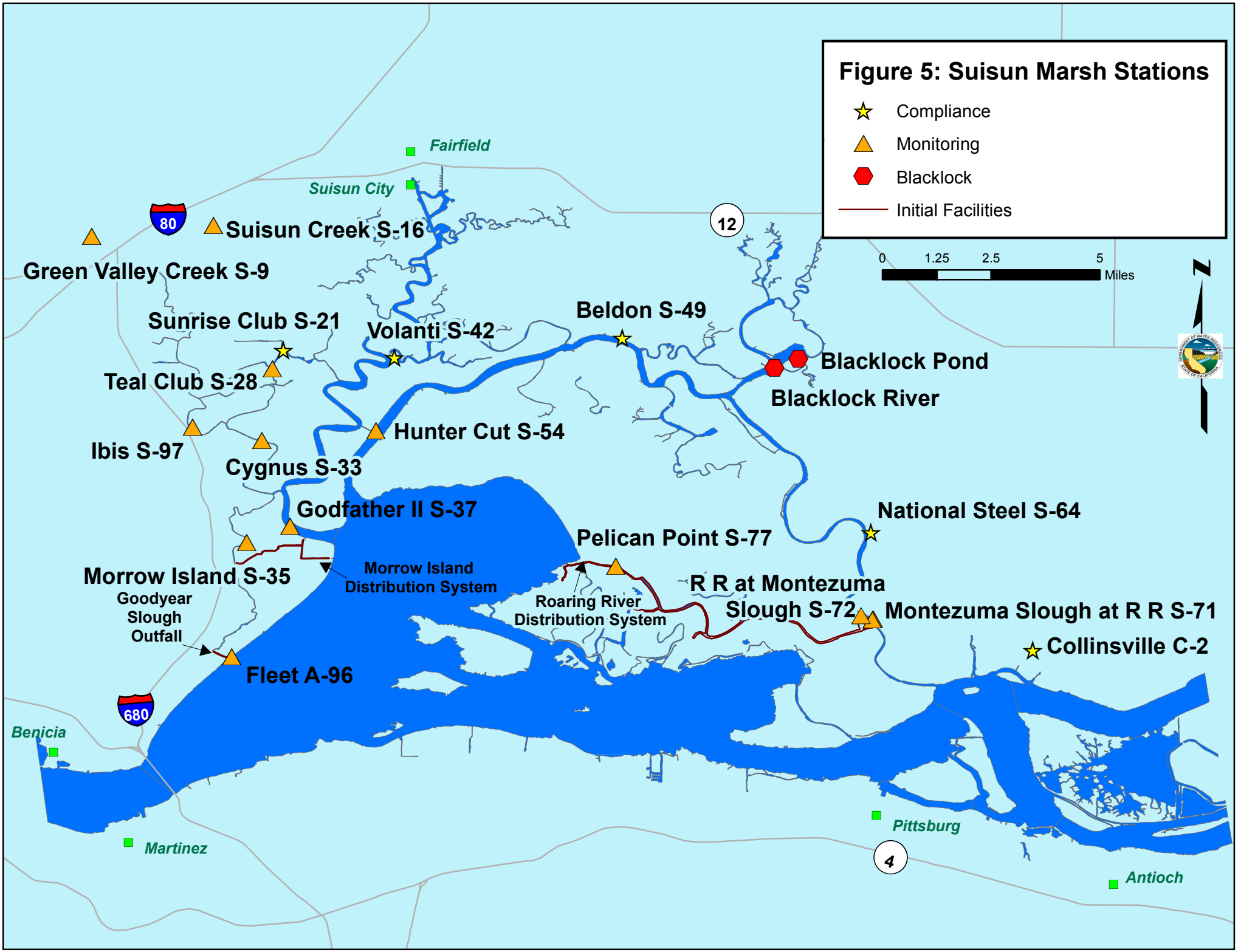


Figure 5: Suisun Marsh Stations
Compliance
Monitoring
Blacklock
Initial Facilities
0 1.25 2.5 5 Miles
N
Fairfield
Suisun City
80
12
Suisun Creek S-16
Green Valley Creek S-9
Sunrise Club S-21
Volanti S-42
Beldon S-49
Blacklock Pond
Blacklock River
Teal Club S-28
Hunter Cut S-54
Ibis S-97
Cygnus S-33
Godfather II S-37
National Steel S-64
Pelican Point S-77
Morrow Island S-35
Morrow Island Distribution System
Goodyear Slough Outfall
Roaring River Distribution System
R R at Montezuma Slough S-72
Montezuma Slough at R R S-71
Collinsville C-2
Fleet A-96
680
Benicia
Martinez
Pittsburg
4
Antioch